5.0 INJECTION WELL CONSTRUCTION

The following sections provide an overview of the construction history of WDW-397 and WDW-398 and confirmation of the current mechanical integrity status of the subject injection wells.

5.1 Pre-Injection Facilities Description

ExxonMobil will utilize pre-injection facilities for storage, removal of suspended solids, temperature adjustment (when necessary) and addition of solids and scaling inhibitors (when necessary) in the waste fluids prior to injection. Unit operations for wastewater pre-treatment will include temperature control, solids control, solids settling, storage and dual-media filtration. The treatment of the wastewater should be more than adequate from an operational perspective.

5.2 Construction Summary for WDW-397

Figure 5-1 is a construction schematic of the WDW-397 injection well (Class I Wastewater Disposal Well Schematic ExxonMobil WDW-397). ExxonMobil constructed and tested the well at its facility located in Pasadena, Texas between December 18, 2005 (conductor installation date) and June 21, 2006 (completion of mechanical integrity and injectivity testing). The well was drilled to a depth of 7,238 feet below ground level (GL), or 7,260 feet below the Kelly Bushing (KB) elevation (accounting for the 22 foot elevation difference between GL and drill rig KB), and was completed as an openhole screen and gravel pack completion within the Frio Formation. All depths in the following discussion for WDW-397 are referenced relative to log-measured KB elevation (22 feet above GL), and are reported to the nearest foot, unless otherwise specified and are approximately 10 feet shallower than pipe measurements.

Surface and Long string Casing

The methodology and procedures employed and performed during the drilling of WDW-397 successfully meet the TCEQ requirements for construction standards in accordance with 30 TAC 331. Three casing strings were required to construct the well. The 20-inch outside diameter (OD) conductor casing was driven to 158 feet GL (180 feet KB) in advance of rig mobilization. The 13 3/8-inch OD surface casing was set at 3,366 feet KB (3,344 feet GL) in a 17 ½-inch borehole. The surface casing was cemented with a lead slurry of 2,031 sacks of Modified Light Standard cement with 3 percent salt, 0.25 percent

HR-7 and ¼ pounds per sack of Phenoseal from approximately 2,766 feet to surface and tail slurry of 360 sacks of Standard cement with 0.1 percent HR-5 from approximately 3,366 feet to 2,766 feet.

After setting and cementing the surface casing, a 12 ¼-inch borehole was advanced to 6,634 feet. The 9 5/8-inch OD long string casing was set at 6,634 feet KB corresponding to 6,612 feet GL. The 9 5/8-inch long string casing was cemented as follows: **First Stage:** 59 barrels EPSEAL synthetic cement from approximately 6,634 feet to 6,199 feet. **Second Stage:** Lead slurry: 495 sacks of Modified Light Premium with 3 percent salt, 0.30 percent HR-7 and ¼ pounds per sack of Phenoseal from approximately 3,002 feet to surface pipe. Intermediate slurry: 2,050 sacks of 50/50 Premium Pozmix with 2 percent Gel, 0.4 percent Halad 334, 0.1 percent HR-5 and ¼ pounds per sack of Phenoseal from approximately 5,699 feet to 3,002 feet. Tail slurry: 330 sacks of Premium cement with 0.4 percent Halad 334 and 0.15 percent HR-5 from approximately 6,199 feet to 5,699 feet.

Completion Interval and Screen and Gravel Pack

After completion of the 9 5/8-inch casing cementing and cement/casing evaluation operations, a brine-based carbonate polymer drilling was used to drill out the 9 5/8-inch float shoe and the 8 ½-inch Completion Interval pilot borehole from 6,634 feet to a depth of 7,260 feet. A coring program was also conducted within the 8 ½-inch Completion Interval pilot hole to collect whole and sidewall core samples from the permitted Injection Interval.

After the 8 ½-inch Completion Interval pilot borehole had been drilled to a total depth of 7,260 feet, open hole wireline logging was conducted to gather lithologic information. After the 8 ½-inch hole wireline logging program had been completed, the lower portion of the borehole was plugged back with a 17 lb/gal densified cement plug from 7,260 to 7,140 feet to serve as a base for the screen assembly. With the 8 ½-inch completion interval pilot hole cleaned out to the plug back depth of 7,140 feet, a series rock-type under-reamers were used to open the 8 ½-inch pilot hole to 16-inches in preparation for screen running and gravel packing operations. A caliper log was then run to determine the volume of sand necessary to gravel pack the screen assembly. The 5 ½-inch Duplex 2507 screen assembly was then run and gravel packed.

The screen and gravel pack assembly was run into the well to bottom at 7,140 feet (top of fill) with the top of the polished nipple initially located at 6,449 feet. The depth to screen and blank intervals follow:

P/N	6,449' to 6,459'	Blank	6,883' to 6,918'
Blank	6,459' to 6,477'	Screen	6,918' to 6,937'
UTT Jt	6,477' to 6,497'	Blank	6,937' to 6,955'
Blank	6,497' to 6,606'	LTT Jt	6,955' to 6,975'
ITT Jt	6,606' to 6,626'	Screen	6,975' to 7,082'
Blank	6,626' to 6,644'	Blank	7,082' to 7,100'
Screen	6,644' to 6,665'	Screen	7,100' to 7,139'
Blank	6,665' to 6,721'	Bull Plug	7,139' to 7,140'
Screen	6,721' to 6,883'		

After the screen had been located across the desired interval, sand control equipment was rigged up to gravel pack the screen assembly in place. After establishing circulation rates, the screen assembly was water packed with 67,250 pounds of 12-20 mesh sand. Gravel pack logging indicated a continuous pack across the logged section of the screen assembly from 7,136 to 6,514 feet. During completion operations, the gravel pack was topped off with 1,400 pounds of 12-20 mesh sand. The post-topoff gravel pack density log indicated the top of sand to be at 6 feet below the polished nipple-to-blank connection.

Completion Interval Stimulation

After completing the baseline differential temperature survey, the screened interval in WDW-397 was treated to "clean up" potential residual polymers and solids from the wellbore and to enhance the injectivity of the well. The first stage of the treatment consisted of a 3,000 gallon soak of open hole gravel pack interval from 7,136 to 6,640 feet with Schlumberger's SP Breaker containing 2,880 gallons of fresh water, 30 gallons of J503 (intermediate temperature enzyme breaker), 90 gallons of L064 (tetramethylammonium chloride) and 750 pounds Sodium Persulfate. After emplacement of the solution was allowed to soak across the open hole gravel pack interval for approximately 16 hours for the purpose of breaking down any potential residual polymer wallcake remaining from the drill-in fluid.

The second stage of the treatment consisted of a 15,000 gallon general matrix stimulation of 7 ½ percent iron sequestered, inhibited hydrochloric acid (FeHCl) containing 150 gallons of corrosion inhibitor, 30 gallons of intermediate temperature enzyme breaker, 300 pounds of iron stabilizer, 90 gallons of clay stabilizer, 750 pounds of potassium chloride (KCl) and 30 gallons of non-emulsifying agent. The acidizing chemicals were pumped down 1 ¼-inch coiled tubing while washing across the screened interval.

After retraction of the coiled tubing from the well, a total of 60,000 gallons of 3 percent KCl water containing 4 percent Clay Stabilizer, 2 gallons/1,000 gallons of scale inhibitor and 2 gallons/1,000 gallons water wetting agent at 92 gallons per minute (gpm).

Packer and Injection Tubing

The 9 5/8-inch x 6 5/8-inch GPS Model "12," Duplex 2507 disposal packer with Duplex 2507 integral polished bore profile sub and overshot was run on the 2 7/8-inch workstring and landed over the 5 ½-inch OD screen assembly polished nipple. The packer was set in the 9 5/8-inch casing from 6,437 to 6,443 feet with the polished bore profile sub and overshot locating from 6,443 to 6,453 feet.

After completion of the preliminary packer/casing pressure test, the running tool was released from the packer and pulled out of the hole. A 500 barrel system of inhibited 9.0 lb/gal LCM brine was blended up containing 75 gallons of Tetra HIB corrosion inhibitor, 50 gallons of Oxban HB oxygen scavenger and 5 gallons of biocide. The well was pre-displaced with 420 barrels of the inhibited 9.0 lb/gal LCM brine system in advance of running the fiberglass injection tubing.

The 6 5/8-inch GPS Model "12," Duplex 2507 latching seal assembly and pre-tested 6 5/8-inch FPI Redbox 2,000 psi rated fiberglass pup joint was run on the first full joint of 6 5/8-inch FPI Redbox 2,000 psi rated fiberglass tubing. A total of 217 full joints, an 11.75-foot pup joint, an 11.25-foot pup joint and one 3.10-foot double pin pup joint (top) of 6 5/8-inch fiberglass tubing were run in addition to the 6 5/8-inch x 9 5/8-inch packer seal assembly and pre-tested 3.90-foot fiberglass pup joint made up to the seal assembly. A 7-inch OD, 26 lb/ft, Duplex 2507 landing joint with Duplex 2507 crossover sub was then made up to the double pin pup joint on the top joint of fiberglass tubing. The seal assembly was latched into the packer at 6,437 feet and the slips set against the Duplex 2507 landing joint in the wellhead with approximately 14,000 pounds tension (approximately 3.5 feet of stretch) over buoyed string weight applied to the injection

tubing. The 9 5/8-inch x 6 5/8-inch annulus was then topped off with approximately 15 barrels of inhibited 9.0 lb/gal brine (with additives as stated above) and a preliminary annular integrity test performed prior to BOP removal.

A successful preliminary annulus pressure test was conducted on the 9 5/8-inch casing x x 6 5/8-inch injection tubing annulus on Tuesday, June 13, 2006 after allowing approximately 75 hours of stabilization following the annulus top off operation. This completed the major construction activities associated with the drilling and completion of WDW-397.

5.3 Mechanical Integrity Testing of WDW-397

Mechanical Integrity Test (MIT) demonstrations were conducted on WDW-397 during and after the completion operations, in which both the internal and external integrity of the well was tested and verified. The internal integrity testing included the preliminary casing and annular pressure testing, as well as an official post-completion annulus pressure test (APT) to determine whether any quantifiable leaks were present in the annulus system. The external integrity testing consisted of baseline differential temperature and RAT surveys. These surveys were used to determine whether injected fluids could migrate vertically upward along the 9 5/8-inch long string casing.

5.3.1 Baseline Differential Temperature Survey

A baseline temperature/differential temperature survey (DTS) was performed on WDW-397 on June 19, 2006. The DTS was run to test for indications of vertical fluid movement behind the 9 5/8-inch long string casing, and will be used as a reference for future DTS analyses. Prior to conducting the DTS, no work had been performed on WDW-397 since June 12, 2006, after the well had been completed with the injection equipment. The intervening 7 days allowed for thermal stabilization of the wellbore and surrounding formations.

The combination differential temperature/casing collar locator tool was run in the hole and the DTS was conducted from surface to a depth of 7,135 feet and correlated to the collar locator signatures on the GCWA preliminary RAT survey dated May 30, 2006.

The log-indicated fluid level is indicated by a significant temperature anomaly at a depth of 429 feet. The average wellbore geothermal gradient, measured from a depth of 450 feet (just below fluid level) to 7,135 feet is approximately 1.33 °F per 100 feet of depth

(assuming a 65 °F mean annual surface temperature). No indication of fluid migration from the approved Injection Interval, or between other intervals was indicated. A copy of the GCWA baseline Differential Temperature Survey dated June 19, 2006 for WDW-397 is included in Appendix F.

5.3.2 Annulus Pressure Test

The annual APT for WDW-397 was conducted on August 19, 2009. A calibrated pressure transducer was installed to the 9 5/8-inch x 6 5/8-inch annulus to record the test. The annulus was pressurized to approximately 1,601 psig using a low volume, positive displacement pump. A brief stabilization period was observed, and the official APT was initiated at 10:19 a.m., with 1,600.64 psig being recorded.

The annulus pressure was monitored and recorded on a computer-recording unit for 30 minutes. After 30 minutes, the system had lost 10.23 psi (final pressure was 1,590.40 psia), which was within the 5 percent allowable range accepted by the TCEQ. The APT data has been included in Appendix F.

5.3.3 Radioactive Tracer Survey

A RAT survey was performed on WDW-397 to determine whether injected fluids would move vertically upward along the 9 5/8-inch long string casing as part of the annual MIT demonstration. The RAT survey was performed on August 19, 2009, and confirmed the mechanical integrity of the injection tubing, packer, longstring casing and external cement across the lower Injection Zone and receiving Injection Interval.

Pre-RAT Gamma Ray Log and Statistical Checks

The wireline lubricator containing the dual detector RAT tool was rigged up on WDW-397. The RAT tool was run into the well and tagged bottom at 7,123 feet. A pre-RAT gamma ray/casing collar locator log (GR/CCL) was run from 7,122 feet to 6,200 feet. The packer assembly was located at 6,437 feet. The tool depth was correlated with the GR/CCL signature from the GCWA RAT log dated October 21, 2008. The tool was then positioned with the lower detector at 6,630 feet (14 feet above uppermost screen opening) and a 5-minute statistical GR check was made. The RAT tool was then repositioned with the lower detector at 6,427 feet (10 feet above top of packer) and a 5-minute statistical GR check was made.

Moving Profile RAT Survey

The RAT tool was positioned with the lower detector at 6,200 feet and a wastewater injection rate of 100 gpm was confirmed. A slug of radioactive Iodine 131 (RA material) was released from the tool and its movement profiled until it had entered into the permitted Injection Interval. A total of four (4) passes were made during the initial moving profile survey.

The RAT tool was repositioned with the lower detector at 6,200 feet and a repeat moving profile was performed. The wastewater injection rate was confirmed at 100 gpm. A slug of radioactive Iodine 131 (RA material) was released from the tool and its movement profiled until it had entered into the permitted Injection Interval. A total of four (4) passes were made during the repeat moving profile survey

Stationary RAT Survey

The RAT tool was positioned with the lower detector at 6,630 feet and the wastewater injection rate was increased to 500 gpm. A slug of RA material was released from the tool and the tool was held stationary while logging in time drive at that depth for 20 minutes. A repeat stationary survey was conducted in which a slug of RA material was released and the tool was held at that depth (6,630 feet) while logging in time drive for 20 minutes. The injection rate was maintained at 500 gpm during the repeat stationary survey.

Post-RAT Gamma Ray Log

After the stationary surveys were completed and it was confirmed that the injected fluids remained within the permitted Injection Zone, injection into the well was ceased, and a post-RAT GR log was run from 7,122 feet to 6,200 feet. The RAT tool was then retrieved from the well.

RAT Survey Results

A pre-RAT GR log was run from 7,122 feet to 6,200 feet. Two (2) profile passes were conducted to confirm the integrity of the tubing, packer and casing from approximately 237 feet above the top of the injection packer to the top of the uppermost screen (screened intervals from 6,644 feet to 7,139 feet). The profile surveys were made while injecting wastewater at a rate of 100 gpm. The profile surveys indicate that the injection equipment from 6,200 feet to the top of the screened interval has demonstrated mechanical integrity. Four (4) log passes were made during both the initial profile survey

and the repeat profile survey. Both profile surveys indicated that the fluid was exiting the screened interval below 6,200 feet.

After completion of the profiling operation, two (2) stationary surveys were conducted with the lower GR detector held stationary approximately 14 feet above the top of the uppermost screen (6,630 feet). These stationary surveys were performed while logging in time drive and injecting at a rate of 500 gpm. The duration of each stationary survey was 20 minutes. These surveys showed no indication of upward fluid movement past either detector, therefore confirming external mechanical integrity (no movement of fluid above permitted Injection Zone).

After completion of the stationary surveys, a final GR/CCL log was run from 7,122 feet to 6,200 feet. A comparison of the final GR/CCL log to the initial GR/CCL base log was made. The final log was essentially identical to the initial base log. No indication of RA tracer material was detected above the top of the screened interval at 6,644 feet.A copy of the GCWA RAT survey dated August 19, 2009 is included in Appendix F. The RAT survey was deemed to be acceptable and the external integrity of WDW-397 was demonstrated.

It can be concluded from the results of the annual MIT that WDW-397 exhibits both internal and external integrity, and meets both the state requirements set forth in 30 TAC 331, and the specific requirements contained in the UIC permit for WDW-397 pertaining to demonstration of mechanical integrity.

5.4 TCEQ Construction Approval Authorization for WDW-397

The TCEQ has reviewed the completion and mechanical integrity testing of WDW-397. The TCEQ approved the well construction and completion in accordance with 30 TAC §§331.45 and 331.65(a)(4) on December 4, 2006. A copy of the authorization letter is included in Appendix A.

5.5 Construction Summary for Injection Well (WDW-398)

Figure 5-2 is a construction schematic of the WDW-398 injection well (Class I Wastewater Disposal Well Schematic ExxonMobil WDW-398). ExxonMobil constructed and tested the well at its facility located in Pasadena, Texas between June 14, 2009 (spud date) and October 1, 2009 (completion of mechanical integrity and injectivity testing). The well was drilled to a depth of 7,200 feet GL, or 7,225 feet KB (accounting for the 25-foot elevation difference between GL and drill rig KB), and was completed as

an openhole screen and gravel pack completion within the Frio Formation. All depths in the following discussion for WDW-398 are referenced relative to log-measured KB elevation (25 feet above GL). Information concerning the construction and testing of ExxonMobil WDW-398 is included in Appendices J1 thru J3.

5.6 Mechanical Integrity Testing of WDW-398

Mechanical Integrity Test (MIT) demonstrations were conducted on WDW-398 during and after the completion operations, in which both the internal and external integrity of the well was tested and verified. The internal integrity testing was confirmed by means of an annulus pressure test (APT) designed to determine whether any quantifiable leaks were present in the annulus system. The external integrity testing consisted of a RAT survey. The external integrity testing was also confirmed via a baseline differential temperature. The RAT and baseline differential temperature surveys were used to determine whether injected fluids could migrate vertically upward along the 9 5/8-inch long string casing.

5.6.1 Baseline Differential Temperature Survey

A baseline temperature/differential temperature survey (DTS) was performed on WDW-398 on September 28, 2009. The DTS was run to test for indications of vertical fluid movement behind the 9 5/8-inch long string casing, and will be used as a reference for future DTS analyses. Prior to conducting the DTS, no work had been performed on WDW-398 since September 25, 2009, after the well had been completed with the injection equipment. The intervening three (3) days allowed for thermal stabilization of the wellbore and surrounding formations.

The combination differential temperature/casing collar locator tool was run in the hole and the DTS was conducted from surface to a depth of 7,100 feet and correlated to the collar locator signatures on the GCWA preliminary RAT survey dated September 1, 2009.

The log-indicated fluid level is evidenced by a significant temperature anomaly at a depth of 122 feet. The average wellbore geothermal gradient, measured from a depth of 350 feet (below fluid level) to 6,750 feet is approximately 1.44 °F per 100 feet of depth. No indication of fluid migration from the approved Injection Interval, or between other intervals was indicated. A copy of the GCWA baseline Differential Temperature Survey

dated September 28, 2009 for WDW-398 is included as Appendix X of Appendix J-3 (Volume XIII).

5.6.2 Annulus Pressure Test

The annual APT for WDW-398 was conducted on September 25, 2009. A calibrated pressure transducer was installed to the 9 5/8-inch x 6 5/8-inch annulus to record the test. The annulus was pressurized to approximately 1,701 psig using a low volume, positive displacement pump. A brief stabilization period was observed, and the official APT was initiated at 8:01 a.m., with 1,701.01 psig being recorded.

The annulus pressure was monitored and recorded on a computer-recording unit for 30 minutes. After 30 minutes, the system had lost 9.73 psi (final pressure was 1,691.28 psia), which was within the 5 percent allowable range accepted by the TCEQ. The APT data has been included in Appendix Y of Appendix J-3 (Volume XIII)..

5.6.3 Radioactive Tracer Survey

A RAT survey was performed on WDW-398 to determine whether injected fluids would move vertically upward along the 9 5/8-inch long string casing as part of the annual MIT demonstration. The RAT survey was performed on September, 2009, and confirmed the mechanical integrity of the injection tubing, packer, longstring casing and external cement across the lower Injection Zone and receiving Injection Interval.

Pre-RAT Gamma Ray Log and Statistical Checks

The wireline lubricator containing the dual detector RAT tool was rigged up on WDW-398. The RAT tool was run into the well and tagged bottom at 7,100 feet. A pre-RAT gamma ray/casing collar locator log (GR/CCL) was run from 7,099 feet to 6,400 feet. The packer assembly was located at 6,437 feet. The GR/CCL signature was tied into the GCWA DTS dated September 28, 2009. The RAT tool was positioned with the lower detector at 6,603 feet (10 feet above the packer), and a five-minute statistical log run. The RAT tool was then positioned with the lower detector at 6,752 feet (8 feet above the 9 5/8-inch casing shoe and 20 feet above the uppermost screen openings), and a five-minute statistical log run.

Moving Profile RAT Survey

The RAT tool was positioned with the lower detector at 6,400 feet (213 feet above top of packer assembly) and an injection rate of 50 gallons per minute was established. A slug

of radioactive Iodine 131 (RA material) was then released and its movement was profiled until it was determined that the material was leaving the packer at 6,628 feet and going into the screened interval below 6,772 feet. A total of four (4) passes were made on the first profile operation.

The RAT tool was repositioned at 6,400 feet and the 50-gallon per minute injection rate was verified. A slug of RA material was again released and its movement was profiled until it was determined that all fluid was going into the Injection Interval. There was no indication of any fluid migrating up hole behind pipe above 6,772 feet. A total of four (4) passes were also made on this repeat profile operation.

Stationary RAT Survey

The RAT tool was then positioned with the lower detector at 6,752 feet (8 feet above the 9 5/8-inch casing shoe and 20 feet above the uppermost screen openings). The injection rate into the well was increased to 210 gallons per minute with no observable pressure. A slug of RA material was released at 6,747 feet and the RAT tool held stationary while logging in time drive for 20 minutes. The injection rate was verified at 210 gallons per minute. A repeat stationary survey was conducted in which a slug of RA material was released and the tool held stationary with the lower detector at 6,752 feet while logging in time drive for a period of 20 minutes with the final injection pressure being 0 psi.

Post-RAT Gamma Ray Log

After the stationary surveys were completed and it was confirmed that the injected fluids remained within the permitted Injection Zone, injection into the well was ceased, and a post-RAT GR log was run from 7,099 feet to 6,400 feet. The remaining RA material was ejected from the tool and the tool was pulled from the well.

RAT Survey Results

The post-completion RAT survey was conducted to confirm the integrity of the injection string and 9 5/8-inch long string casing from approximately 213 feet above the top of the disposal packer assembly, and to assess whether injected fluids could move vertically upward along the outside of the 9 5/8-inch long string casing of WDW-398. Two moving profile surveys were made while injecting water at a rate of 50 gallons per minute. These passes indicate that the 9 5/8-inch long string casing and the surrounding cement sheath possess external mechanical integrity; no RA material was indicated to be moving upward behind the 9 5/8-inch long string casing. A total of four (4) logging passes were

made during both the initial profile and the repeat profile surveys. The profile surveys indicated that the injected fluid was exiting into the screened interval below 6,772 feet.

Two stationary surveys were then conducted with the lower GR detector held stationary at 6,752 feet (8 feet above the 9 5/8-inch casing shoe and 20 feet above the uppermost screen openings). These stationary surveys were performed while logging in time drive for 20 minutes and injecting water at a rate of 210 gallons per minute. These surveys indicate that the 9 5/8-inch long string casing and the surrounding cement sheath possess external mechanical integrity; no RA material was indicated to be moving upward behind the 9 5/8-inch long string casing. A comparison of the final GR/CCL log to the initial GR/CCL base log was then made. The final log was essentially identical to the initial base log. A copy of the GCWA RAT survey dated September 28, 2009 is included in Appendix Z of Appendix J-3 (Volume XIII)..

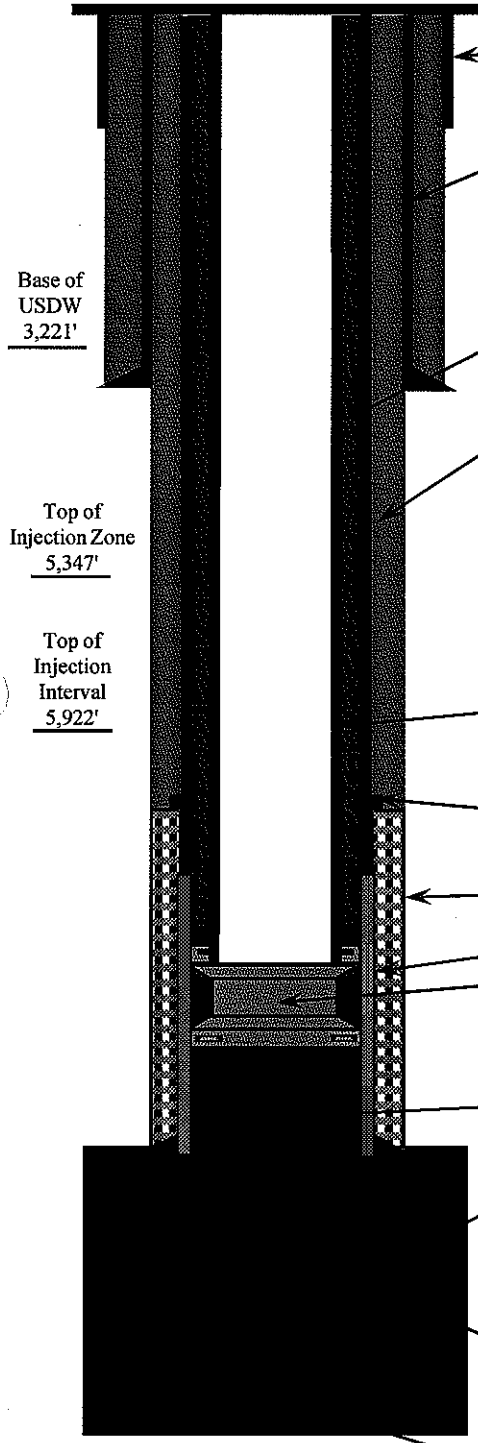
It can be concluded from the results of the annual MIT that WDW-398 exhibits both internal and external integrity, and meets both the state requirements set forth in 30 TAC 331, and the specific requirements contained in the UIC permit for WDW-398 pertaining to demonstration of mechanical integrity.

5.7 TCEQ Construction Approval Authorization for WDW-398

The TCEQ has reviewed the completion and mechanical integrity testing of WDW-398. The TCEQ approved the well construction and completion in accordance with 30 TAC §§331.45 and 331.65(a)(4) on August 13, 2010. A copy of the authorization letter is included in Appendix A.

FIGURE 5-1
Construction Schematic of ExxonMobil WDW-397
Pasadena, Texas

All Depths Reflect KB Elevation = 22' AGL for H&P Rig 146



Conductor Pipe: 20" driven to approximately 180'.

Surface Casing: 13 3/8", 68 lb/ft, K-55, STC and BTC from surface to approx. 3,366' in 17 ½" hole. Cemented with lead slurry of 2,031 sx Modified Light Standard cement with 3% salt, 0.25% HR-7 and ¼ pps Phenoseal from approx. 2,766' to surface and tail slurry of 360 sx Standard cement with 0.1% HR-5 from approx. 3,366' to 2,766'.

Annulus Fluid: Inhibited 9.0 lb/gal LCM NaCl brine packer fluid containing Tetra corrosion inhibitor, oxygen scavenger and biocide.

Long String Casing: 9 5/8", 47 lb/ft, L-80, LTC carbon steel from surface to approx. 6,264' pipe **(6,254' log)** and 9 5/8", 47 lb/ft, SM2535-110 (110 ksi) CRA with VAM FJL connections from approx. 6,264' to 6,644' pipe **(6,254' to 6,634' log)**. Cemented as follows: **First Stage:** 59 barrels EPSEAL synthetic cement from approx. 6,644' to 6,209' pipe **(6,634' to 6,199' log).** **Second Stage:** Lead slurry: 495 sx Modified Light Premium with 3% salt, 0.30% HR-7 and ¼ pps Phenoseal from approx. 3,012' to surface pipe **(3,002' to surface log).** Intermediate slurry: 2,050 sx 50/50 Premium Pozmix with 2% Gel, 0.4% Halad 334, 0.1% HR-5 and ¼ pps Phenoseal from approx. 5,709' to 3,012' pipe **(5,699' to 3,002' log).** Tail slurry: 330 sx Premium cement with 0.4% Halad 334 and 0.15% HR-5 from approx. 6,209' to 5,709' pipe **(6,199' to 5,699' log).**

Injection Tubing: 6 5/8" TFC Red Box 2,000 psi-rated fiberglass with Groundwater Protection Systems Duplex 2507 CRA latching seal assembly (w/ 5.125" integral polished bore profile) into top of packer at approx. 6,447' pipe **(6,437' log).** 7", 26 lb/ft, Duplex 2507 landing joint crossed over to 6 5/8" fiberglass in upper 25' of tubing system.

Stage Tool: 9 5/8" from approx. 6,209' to 6,211' pipe **(6,199' to 6,201' log)** .

EPSEAL Synthetic Cement

9 5/8" SM2535-110 CRA Section

Packer: Groundwater Protection Systems 9 5/8" x 6 5/8" Duplex 2507 CRA retrievable packer (w/ 5.0" integral polished bore profile) and Duplex 2507 CRA sealing overshot from 6,447' to 6,463' pipe **(6,437' to 6,453' log).**

Blank Riser & Screen: 5 ½" Duplex 2507 CRA blank/base pipe and 25 gauge Alloy 825 wire-wrapped screen assembly gravel packed in 16" open hole with 67,250 lbs of 12/20 mesh sand and topped off with 1,400 lbs of 12/20 mesh sand on 5/18/06 with top of sand at 6,460'. Screen assembly relative to **log** depth is as follows:

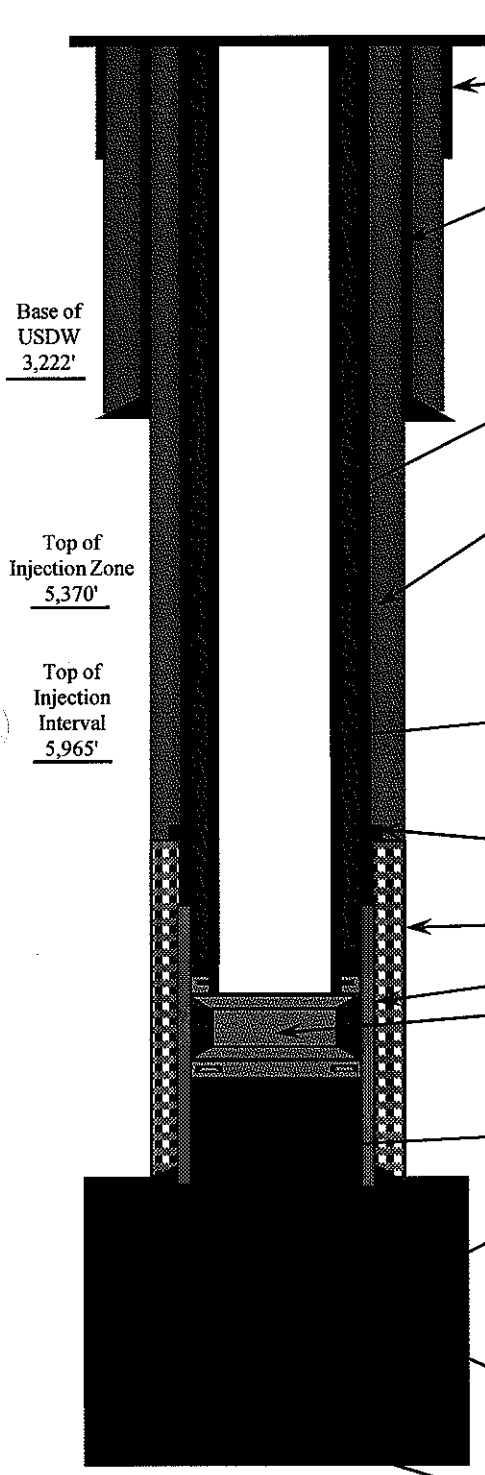
P/N	**6,449' to 6,459'**	**Blank**	**6,883' to 6,918'**
Blank	**6,459' to 6,477'**	**Screen**	**6,918' to 6,937'**
UTT Jt	**6,477' to 6,497' (UTT Screen f/ 6,492' to 6,495')**	**Blank**	**6,937' to 6,955'**
Blank	**6,497' to 6,606'**	**LTT Jt**	**6,955' to 6,975'**
ITT Jt	**6,606' to 6,626' (ITT Screen f/ 6,621' to 6,624')**	**(LTT Screen f/ 6,971' to 6,974')**	
Blank	**6,626' to 6,644'**	**Screen**	**6,975' to 7,082'**
Screen	**6,644' to 6,665'**	**Blank**	**7,082' to 7,100'**
Blank	**6,665' to 6,721'**	**Screen**	**7,100' to 7,139'**
Screen	**6,721' to 6,883'**	**Bull Plug**	**7,139' to 7,140'**

Open Hole: Drilled and under-reamed to 16" from approx. 6,644' to 7,150' pipe **(6,634' to 7,140' log).** Cement plug for screen base from approx. 7,260' to 7,150' pipe **(7,250' to 7,140' log).**

Fill Depth: 7,123' on 08/19/09 GCWA RAT Log.

DRAWN BY: RFB	CHECKED BY: TDM	FILE: 09-104	©2010	DATE: 07/29/10 REV.: 0

FIGURE 5-2
Construction Schematic of ExxonMobil WDW-398
Pasadena, Texas



Conductor Pipe: 20" driven to approximately 95'.

Surface Casing: 13 3/8", 61 lb/ft, J-55, BTC from surface to approx. 3,372' in 17 ½" hole. Cemented with lead slurry of 2,145 sx EconoCem cement with 3% salt, 0.6% HR-7 and ¼ pps PhenoSeal calculated to cover the interval from approx. 2,770' to surface and tail slurry of 555 sx HalCem cement from approx. 3,372' to 2,770'. Top off with 100 sx Standard cement.

Annulus Fluid: Inhibited 9.0 lb/gal LCM NaCl brine packer fluid containing Tetra corrosion inhibitor, oxygen scavenger and biocide.

Long String Casing: 9 5/8", 53.5 lb/ft, Q125, Hydril 563, carbon steel casing from surface to approx. 6,547' and 9 5/8", 53.5 lb/ft, SM2535-110, Vam Top, chrome alloy casing from 6,547' to approx. 6,760'. Cemented as follows:
First Stage: 50 barrels EPSEAL synthetic cement from approx. 6,760' to 6,540'.
Second Stage: Lead slurry: 1,700 sx EconoCem with 0.4% Halad 334, 0.1% HR-7, 0.15% WG-17 and ¼ pps PhenoSeal from approx. 6,040' to surface. Tail slurry: 385 sx HalCem cement with 0.4% Halad 334 and 0.3% HR-800 from approx. 6,540' to 6,040'.

Injection Tubing: 6 5/8" Future Pipe Red Box 2000 fiberglass tubing with Nexus Veil lining and Delta P Duplex 2507 CRA latching seal assembly (w/ 5.125" integral polished bore profile) into top of packer at approx. 6,600'. Crossed over from 6 5/8" FG to 7", 26 lb/ft, Duplex 2507 landing joint at the surface.

Stage Tool: 9 5/8" from approx. 6,540' to 6,543'.

EPSEAL Synthetic Cement

9 5/8" SM2535 CRA Section

Packer: Delta P Model 12, 9 5/8" x 6 5/8" Duplex 2507 CRA retrievable packer (w/ 5.0" integral polished bore profile) and Duplex 2507 CRA sealing overshot from 6,600' to 6,615'.

Blank Riser & Screen: 5 ½" G3-110 CRA blank/base pipe and G3-110, 25 gauge Alloy 825 wire-wrapped screen assembly gravel packed in 16" open hole with 41,400 lbs of 12/20 mesh sand and topped off with 6,650 lbs of 12/20 mesh sand on 8/20/09 and 9/2/09 with top of sand at 6,668'. Screen assembly relative to **log** depth is as follows:

P/N	6,613' to 6,623'	Screen	6,870' to 6,904'
Blank	6,623' to 6,652'	Screen	6,904' to 6,937'
UTT Jt	6,652' to 6,683' (with 10 ft of Screen)	Screen	6,937' to 6,969'
Blank	6,683' to 6,713'	Screen	6,969' to 7,000'
Blank	6,713' to 6,743'	Screen	7,000' to 7,033'
Blank	6,743' to 6,771'	Screen	7,033' to 7,065'
Screen	6,771' to 6,804'	Screen	7,065' to 7,098'
Screen	6,804' to 6,837'	Screen	7,098' to 7,131'
Screen	6,837' to 6,870'	Screen	7,131' to 7,164'
		Bull Plug	7,164' to 7,165'

Open Hole: Drilled and underreamed to 16" from approx. 6,760' to 7,225'. Cement plug for screen base from approx. 7,225' to 7,165'.

Fill Depth: 7,100' on 9/30/09 GCWA RAT Log.

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